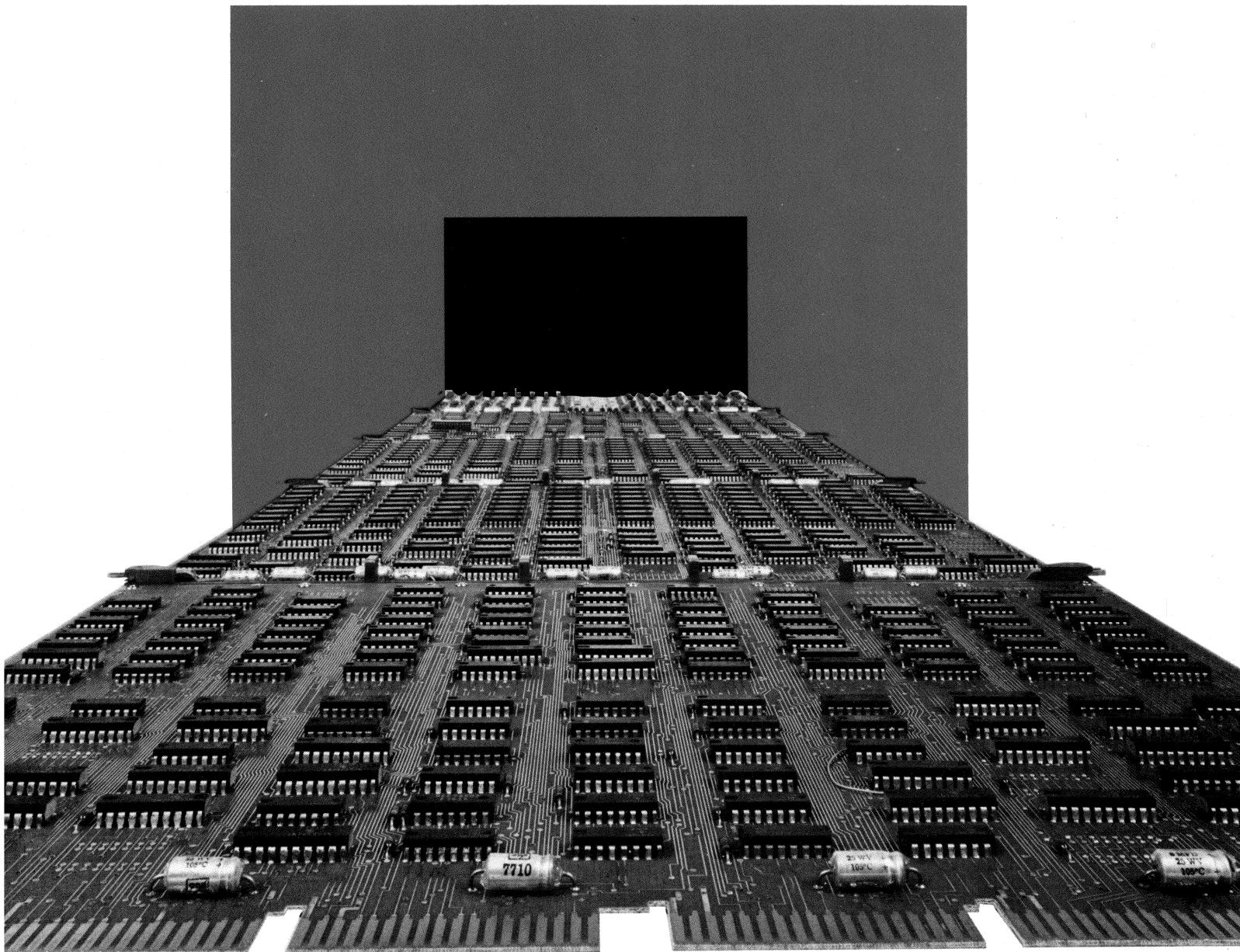


VAX-11/780

Processor Internals

Supplementary Diagrams and Listings



digital

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VAX~11/780

Processor Internals

Supplementary Diagrams and Listings

COURSE NUMBER
EY-C5114-LE-001
(J6024-A)

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	VMS	IAS

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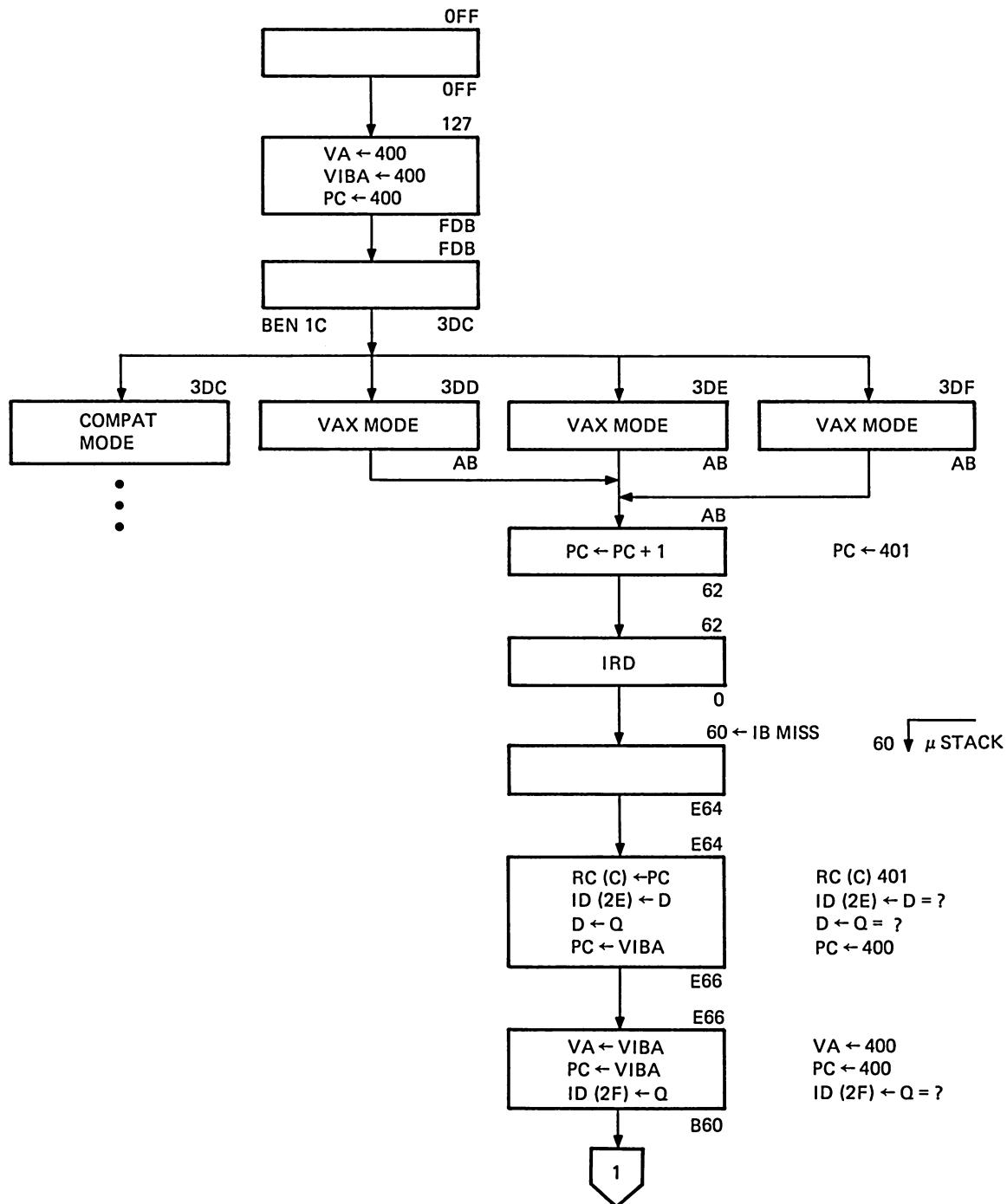
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INTRODUCTION

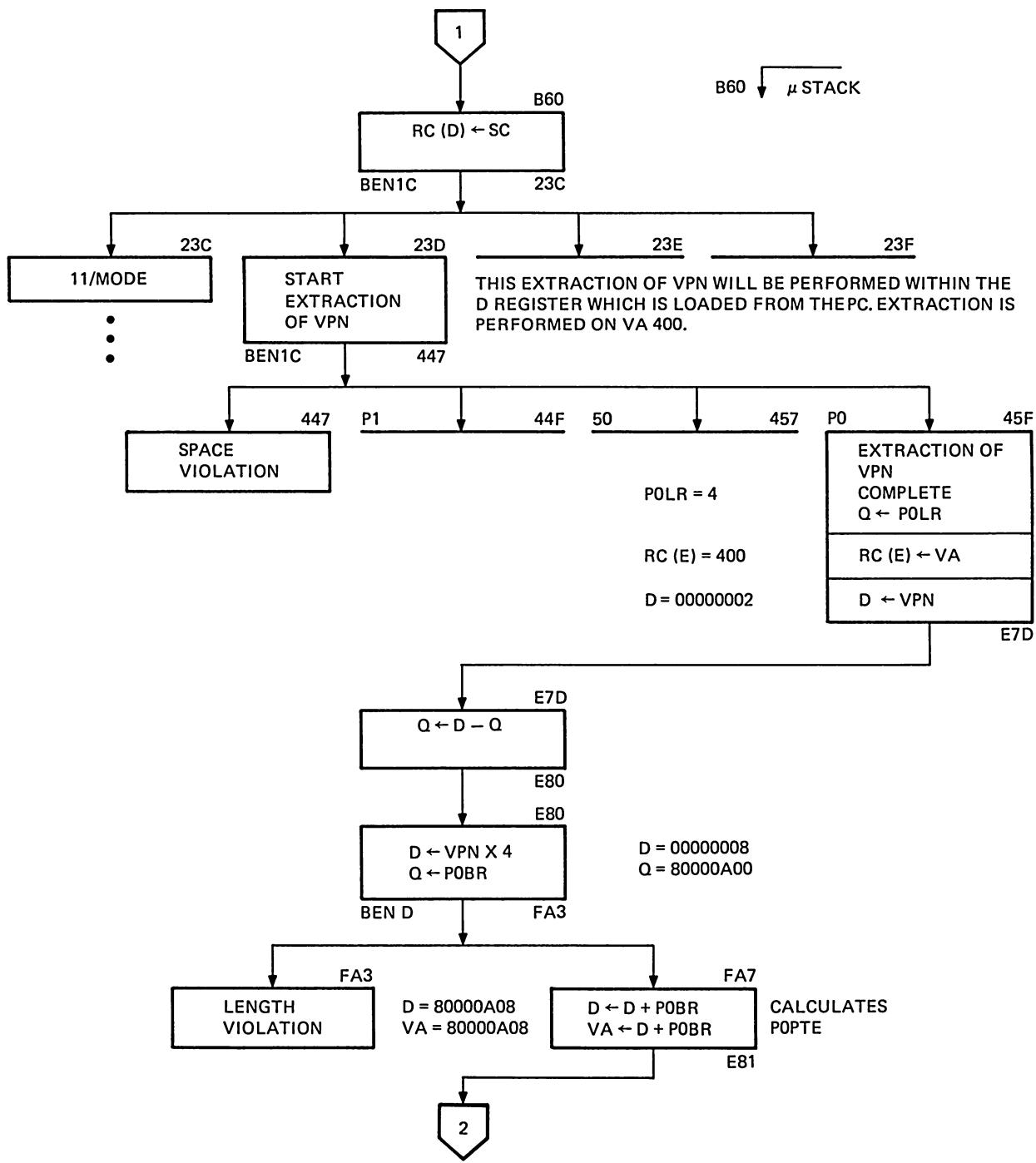
Students taking the VAX-11/780 Processor Internals course will need to refer to this booklet while studying the 11/780 Internal Operations module. This reference presents, in summary form, the data needed to analyze the program being studied.

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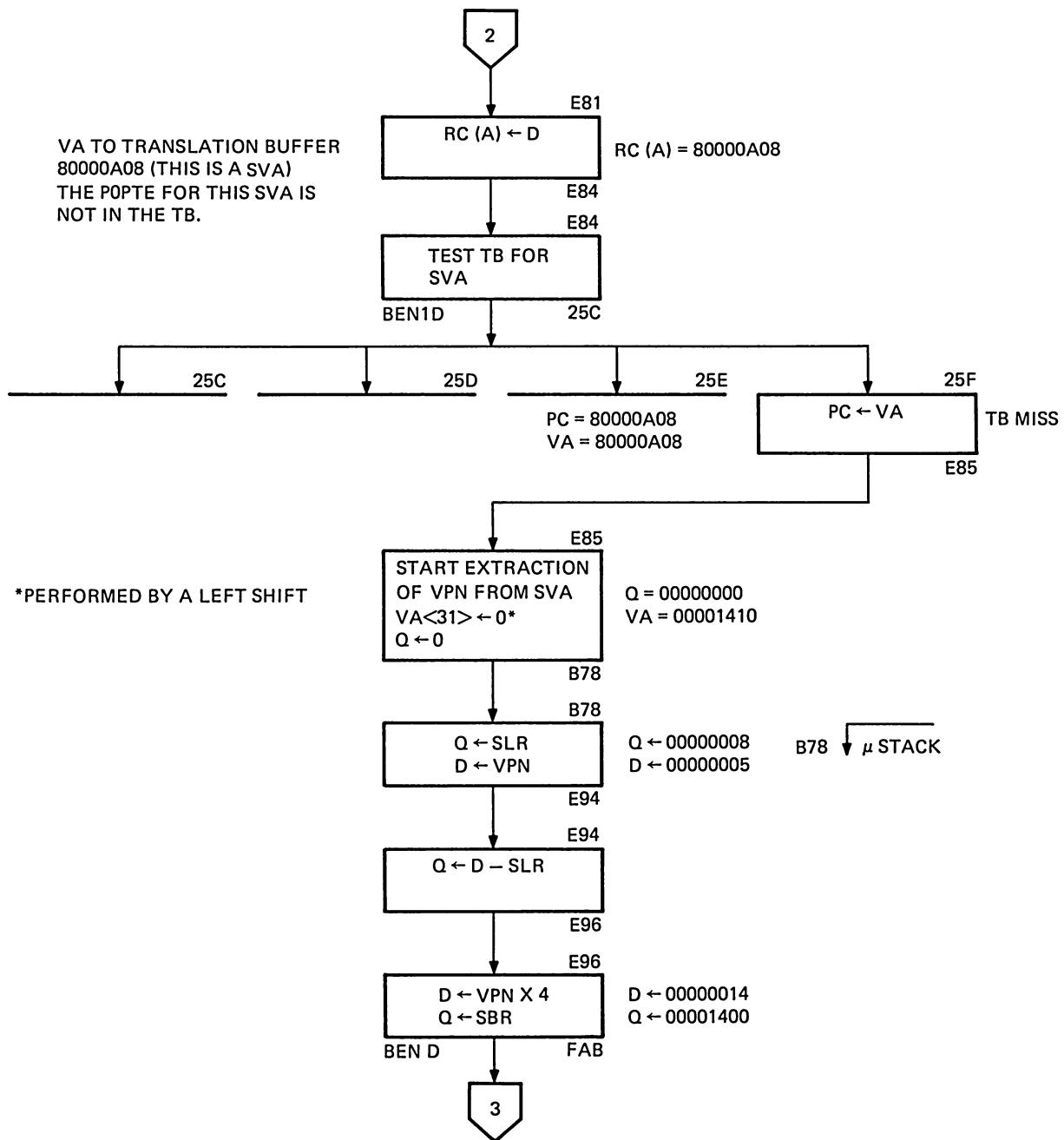
TK-4343

Translation Flow Diagram (Sheet 1 of 5)



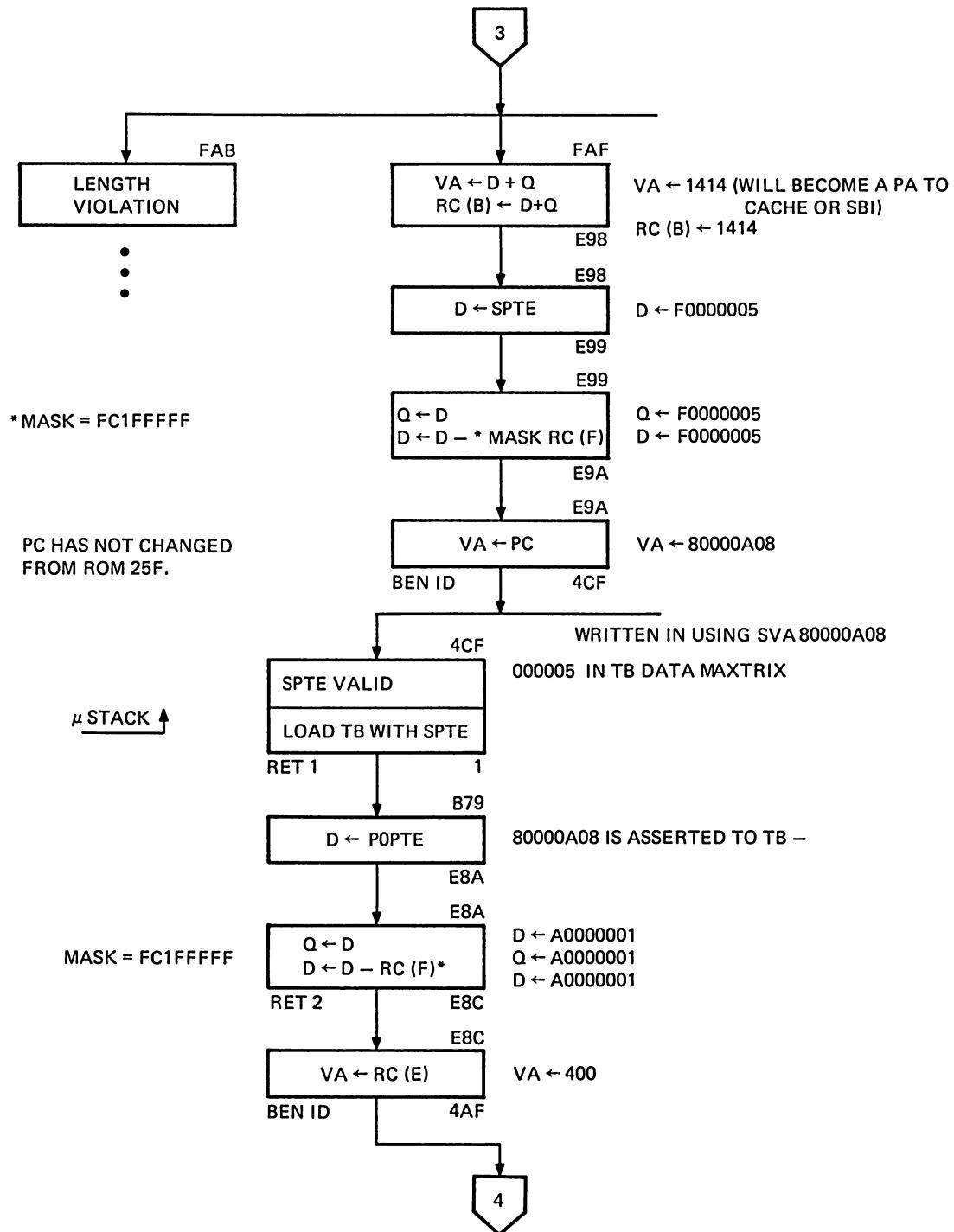
TK-4344

Translation Flow Diagram (Sheet 2 of 5)



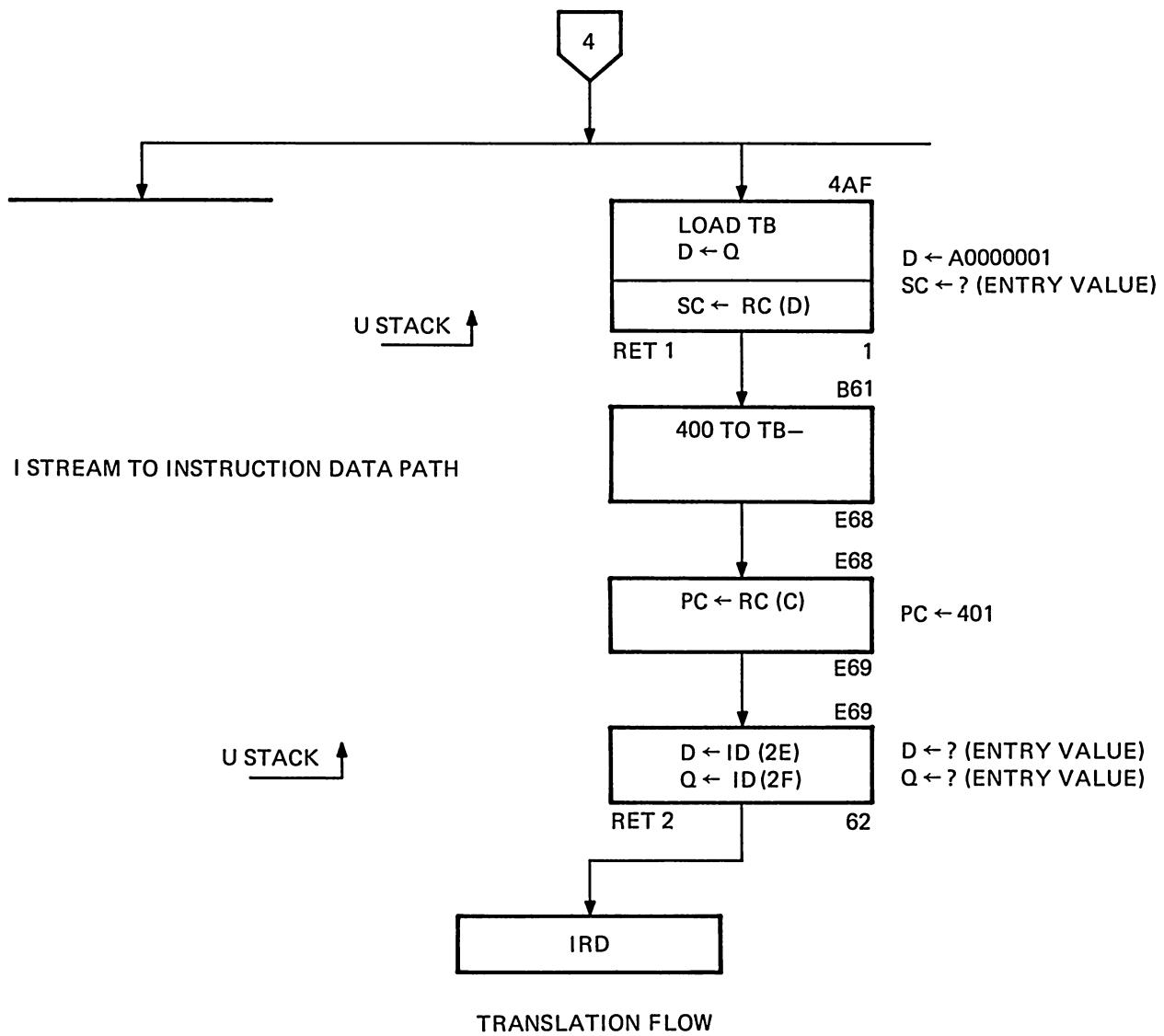
TK-4345

Translation Flow Diagram (Sheet 3 of 5)



TK-4346

Translation Flow Diagram (Sheet 4 of 5)



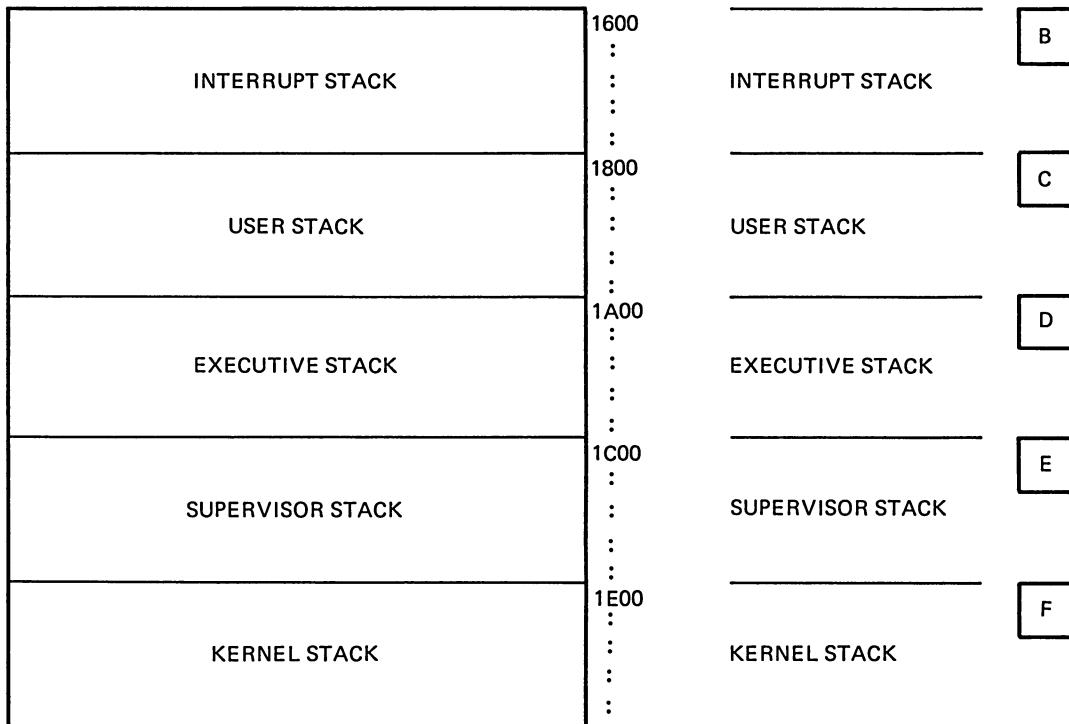
Translation Flow Diagram (Sheet 5 of 5)

		PFN
00000003		0
00000003		0
:		
80000100	! ACCESS VIOLATION	4
80000000	! PAGEFAULT (XULATION NOT V)	20
00000003		24
:		28
90528190	! MOVB (R1)+, R2	28
52815483	! MOVB (R3)+, R4	:
00005554	! ADDB3 R2, R4, R5	200
	! HALT	204
90528190	!	208
52815483	! SAME CODE AS ABOVE	:
00005554	!	300
		304
		308
0000000A	! FIRST P0 OPERAND	400
		:
		600
		:
885857D0	! MOVL R7, R8	600
03AA808F	! BISB # X80, 3(R10)	800
025E08C0	! CLEAN UP STACK	804
	! REI	808
		:
00000206	! LDPCTX	850
	! REI	:
D05E08C0	! CLEAN UP STACK	850
50DA5957	! MOVL R7, R9	900
8F880710	! MTPR R0, \$PR\$_PCBB	904
DA03AAA0	! SVPCTX	908
02061050	! BISB # XA0, 3(R10)	90C
	! MTPR R0, # PR\$_PCBB	:
	! LDPCTX	:
	! REI	:
00000000	! POPTE FOR NO ACCESS PAGE	A00
A0000002	! POPTE FOR FIRST P0 OPERAND	A04
A0000001	! POPTE FOR PROGRAM	A08
A0000006	! POPTE FOR SECOND OPERAND	A0C
		:
		5

TK-4336

Physical Address Layout (Sheet 1 of 3)

0000000B ! SECOND P0 OPERAND		C00	6
		:	
		E00	
		E04	
		E08	
		E0C	
		E10	
		E14	
		:	
		1000	
		:	
		1000	8
		:	
		1200	
		1204	
		1208	
		120C	
		1210	
		1214	
		1218	
		121C	
		1220	
		1224	
		1228	
		122C	
		1230	
		1234	
		1238	
		123C	
		1240	
		1244	
		1248	
		124C	
		1250	
		1254	
		1258	
		125C	
		:	
		1400	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	A
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	
		1410	
		1414	
		1418	
		141C	
		:	
		1400	
		:	
		1404	
		1408	
		140C	



REGISTER INITIALIZATION VALUES –

IPR	NAME	VALUE
4	ISP	80000400
C	SBR	1400
D	SLR	8
10	PCBB	1200
11	SCBB	0
38	MME	1
39	TBIA	0

OTHERS

R0	R0	0
R1	R1	0
R2	R2	0
R3	R3	0
R4	R4	0
R5	R5	0
R6	R6	0
R7	R7	0
R8	R8	0
R14	SP	80000400
ID F	PSL	04000000

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Physical Address Layout (Sheet 3 of 3)

P0 SPACE (PROGRAM REGION)	NO ACCESS PAGE	00000000
	OPERAND #1	00000200
	PO MAIN PROGRAM	00000400
	OPERAND #2	00000600
	NOT MAPPED	00000800
		3FFFFFFF
	NOT MAPPED	40000000
		7FFFF3FF
	USER STACK	7FFFF400
	NO ACCESS PAGE	7FFFF600
P1 SPACE (CONTROL REGION)	KERNEL STACK	7FFFF800
	EXECUTIVE STACK	7FFFFA00
	SUPERVISOR STACK	7FFFFC00
	NO ACCESS PAGE	7FFFFE00
		80000000
	PAGE FAULT & SYSTEM CODE	
	INTERRUPT STACK	80000200
	SCB (SYSTEM CONTROL BLOCK)	80000400
	OLD PCB STORAGE	80000600
	NEW PCB (PROCESS CONTROL BLOCK)	80000800
S0 SPACE (SYSTEM SPACE)	POPT (P0 PAGE TABLE)	80000A00
	P1PT (P1 PAGE TABLE)	80000C00
	SPT (SYSTEM PAGE TABLE)	80000E00
	NOT MAPPED	80001000

TK-4333

Virtual Address Layout

TRANSLATION BUFFER

**WILL CREATE A TB MISS 1ST GO AROUND –
AN SVA ADDRESS IS GENERATED**

μSTATE
FA7

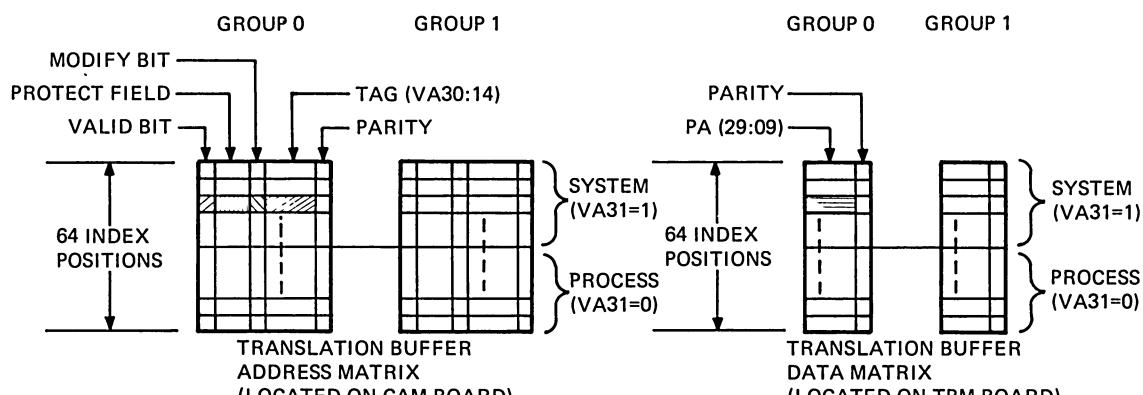
PRESENTED TO TB

μSTATE
E84

TAG=0 INDEX=25

SPTE FETCHED FROM ADDRESS 1414 THIS WILL BE WRITTEN INTO TB

μ STATE
E98



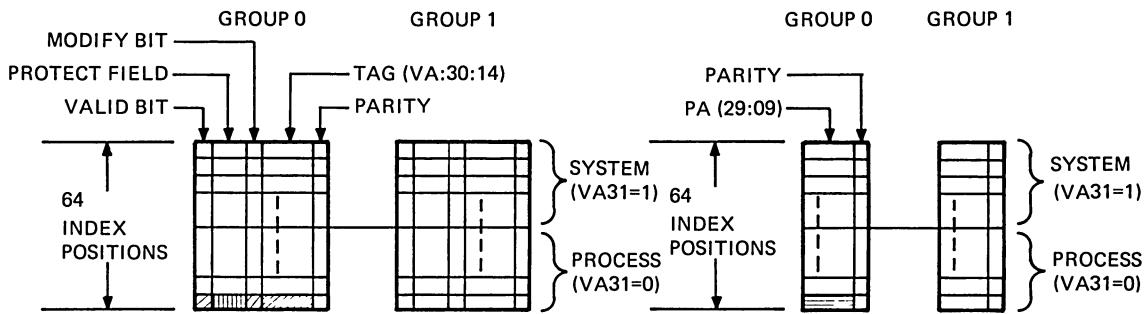
(LOCATED ON CAM BOARD)
GROUPS ARE SELECTED AT RANDOM TO WRITE INTO

SRTE WILL GENERATE THE PA FOR PORTS WHICH IS FETCHED, AND WRITTEN INTO TR GROUPS ARE SELECTED AT RANDOM TO WRITE INTO.

μ STATE
4AF

THIS WILL BE WRITTEN INTO TB USING SVA 400
INDEX 2
TAG 9

TK 4452



WHEN VA 404 IS ASSERTED

313029 2827262524 2322 21201918171615 1413121110 0908070605 0403020100

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

INDEX=LOCATION 2
TAG OF VA=TAG IN LOCATION 2

HIT

PFN FROM TB=PA(29:9)

201918171615 141312 1110 0908070605 040302 0100

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

CONCATENATED WITH BITS (8:0) OF SVA

08070605 0403020100

0	0	0	0	0	0	1	0	0
---	---	---	---	---	---	---	---	---

CREATES A PA OF 204
THIS GOES TO CACHE

31302928 27262524 23222120 19181716 15141312 1110 09080706 050403020100
PA

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

512 LOCATIONS

TAG (29:12)
DUAL INDEX
INDEX (11:3)
SELECTS LOCATION
IN BOTH GROUPS OF
ADDRESS AND DATA
MATRIX

INDEX=40
TAG=0

INDEX
(11:3) AND (2)
SELECTS DATA LONG WORD
OF THE INDEXED LOCATION
OF DATA MATRIX.

NOTE:
ADDRESS 200 ADDRESS 204
TAG=0 TAG=0
INDEX=40 INDEX=40
BIT2=0 LOW WORD BIT2=1 HIGH WORD

TK-4453

Translation Buffer (Sheet 2 of 2)

127

UWORD IN HEX = 20140E380180F80042000FDB UWORD ADDRESS = 0127

KEY / 999999888888888877777777666666665555555544444444433333333222222222111111110000000000
\ 54321098765432109876543210987654321098765432109876543210987654321098765432109876543210

BINARY = 00100000000101000001100011000000000011000000111100000000000010000100000000000011111011011

ACF = 0	NOOP	IEK = 1	ISTR
ACM = 3	TBS	JMP = FDB	
ADS = 1	PHYSICAL	KMX = 0	8
ALU = E	B	MCT = 1F	ALLOW.IB.READ
AMX = 0	LA	MSC = 0	NOOP
BEN = E	INTERRUPT	QK = 0	NOOP
BMX = 5	PC	PCK = 0	NOOP
CCK = 0	NOOP	RMX = 0	RAMX_D RBMX_Q
CID = 7	ID REG_ID BUS-ID ADR=KMX	SCK = 0	NOOP
DK = 0	NOOP	SGN = 0	NOOP
DT = 0	LONG	SHF = 0	ALU
EALU = 0	A	SI = 3	0 D_0 Q_0
EBMX = 0	FE	SMX = 0	EALU
FEK = 0	NOOP	SPO = 0	NOOP
FS = 0	ENABLE MCT	SUB = 0	NOOP
IBC = 2	FLUSH, LOAD VIBA	VAK = 1	LOAD VA

14

FDB

UWORD IN HEX = 30001C3C01801C00000003DC UWORD ADDRESS = 0FDB

KEY / 99999988888888887777777766666666555555554444444443333333322222222111111110000000000
\ 54321098765432109876543210987654321098765432109876543210987654321098765432109876543210

BINARY = 00110000000000000000110000111100000000011000000000001110000000000000000000000000000001111011100

ACF = 0	NOOP	IEK = 0	NOOP
ACM = 3	TBS	JMP = 3DC	
ADS = 0	VIRTUAL	KMX = 0	8
ALU = F	A	MCT = 3	UNUSED
AMX = 0	LA	MSC = 0	NOOP
BEN = 1C	PSL MODE	QK = 0	NOOP
BMX = 0	MASK	PCK = 0	NOOP
CCK = 0	NOOP	RMX = 0	RAMX_D RBMX_Q
CID = 3	CNSL CONT	SCK = 0	NOOP
DK = 0	NOOP	SGN = 0	NOOP
DT = 0	LONG	SHF = 0	ALU
EALU = 0	A	SI = 3	0 D_0 Q_0
EBMX = 0	FE	SMX = 0	EALU
FEK = 0	NOOP	SPO = 0	NOOP
FS = 1	ENABLE CID	SUB = 0	NOOP
IBC = 3	START	VAK = 0	NOOP

15

16

```

E64  UWORD IN HEX = 1C140038B9803DE22C000E66    UWORD ADDRESS = 0E64
      KEY / 99999988888888877777777666666665555555544444444433333333322222222111111110000000000
      \ 54321098765432109876543210987654321098765432109876543210987654321098765432109876543210
      -----
BINARY = 000111000001010000000000001100010111001100000000011101110001000101100000000000000111001100110
      ACF = 0      NOOP          IEK = 0      NOOP
      ACM = 3      TBS           JMP = E66
      ADS = 0      VIRTUAL       KMX = 2E    19
      ALU = E      B             MCT = 7      LOCKWRITE,V,XCHK
      AMX = 0      LA            MSC = B      SET NESTED ERR
      BEN = 0      NOP           QK = 0      NOOP
      BMX = 5      PC            PCK = 2      PC_VIBA
      CCK = 0      NOOP          RMX = 0      RAMX_D RBMX_Q
      CID = 7      ID REG_ID BUS-ID ADR=KMX  SCK = 0      NOOP
      DK = C      LOAD_Q        SGN = 0      NOOP
      DT = 0      LONG           SHF = 0      ALU
      EALU = 0     A              SI = 3      0 D_0 Q_0
      EBMX = 0     FE             SMX = 0      EALU
      FEK = 0      NOOP          SPO = 3C    WRITE RC TC
      FS = 1      ENABLE CID    SUB = 0      NOOP
      IBC = 1      STOP           VAK = 0      NOOP

```

17

18

19

20

21

ACF = 0	NOOP	IEK = 0	NOOP
ACM = 3	TBS	JMP = E84	8
ADS = 0	VIRTUAL	KMX = 0	TEST.RCHK
ALU = F	A	MCT = 0	INH CM
AMX = 1	RAMX	MSC = F	
BEN = 0	NOP	QK = 0	NOOP
BMX = 0	MASK	PCK = 0	NOOP
CCK = 0	NOOP	RMX = 0	RAMX_D RBMX_Q
CID = 0	NOOP	SCK = 0	NOOP
DK = 0	NOOP	SGN = 0	NOOP
DT = 0	LONG	SHF = 0	ALU
EALU = 0	A	SI = 3	0 D_0 Q_0
EBMX = 0	FE	SMX = 0	EALU
FEK = 0	NOOP	SPO = 3A	WRITE RC TA
FS = 0	ENABLE MCT	SUB = 0	NOOP
IBC = 0	NOOP	VAK = 0	NOOP

ACF = 0	NOOP	IEK = 0	NOOP
ACM = 3	TBS	JMP = 25C	8
ADS = 0	VIRTUAL	KMX = 0	
ALU = F	A	MCT = 1	MEM NOP
AMX = 0	LA	MSC = F	INH CM
BEN = 1D	TRANSLATION TEST	QK = 0	NOOP
BMX = 0	MASK	PCK = 0	NOOP
CCK = 0	NOOP	RMX = 0	RAMX-D RBMX-G
CID = 1	UNUSED	SCK = 0	NOOP
DK = 0	NOOP	SGN = 0	NOOP
DT = 0	LONG	SHF = 0	ALU
EALU = 0	A	SI = 3	0 D_0 Q_0
EBMX = 0	FE	SMX = 0	EALU
FEK = 0	NOOP	SPO = 0	NOOP
FS = 0	ENABLE MCT	SUB = 0	NOOP
IRB = 0	NOOP	VAK = 0	NOOP

23

E96 UWORD IN HEX = 01000D3C99F02C0000000FAB UWORD ADDRESS = 0E96

KEY / 999999888888888777777766666666555555554444444444333333332222222211111111100000000000
 \ 54321098765432109876543210987654321098765432109876543210987654321098765432109876543210

BINARY = 0000000100000000000011010011110010011001111100000010110000000000000000000000000000000011110101011

ACF = 0	NOOP	IEK = 0	NOOP
ACM = 3	TBS	JMP = FAB	
ADS = 0	VIRTUAL	KMX = 26	SPARE
ALU = F	A	MCT = 5	WRITE.V.NOCHK
AMX = 0	LA	MSC = 0	NOOP
BEN = D	SIGNS	QK = F	LOAD ID BUS
BMX = 0	MASK	PCK = 0	NOOP
CCK = 0	NOOP	RMX = 0	RAMX_D RBMX_Q
CID = 5	ID BUS_ID REG-ID ADR=KMX	SCK = 0	NOOP
DK = 1	DOUBLE SHIFT LEFT	SGN = 0	NOOP
DT = 0	LONG	SHF = 0	ALU
EALU = 0	A	SI = 3	0 D_0 Q_0
EBMX = 0	FE	SMX = 0	EALU
FEK = 0	NOOP	SPO = 0	NOOP
FS = 1	ENABLE CID	SUB = 0	NOOP
IBC = 0	NOOP	VAK = 0	NOOP

FAF UWORD IN HEX = 001D0014018009D83E000E98 UWORD ADDRESS = FAF

KEY / 999999888888888777777766666666555555554444444444333333332222222211111111100000000000
 \ 54321098765432109876543210987654321098765432109876543210987654321098765432109876543210

BINARY = 00000000001101000000000010100000000110000000000100110100000111110000000000011010011000

ACF = 0	NOOP	IEK = 0	NOOP
ACM = 3	TBS	JMP = E98	
ADS = 0	VIRTUAL	KMX = 0	8
ALU = 5	A+B	MCT = 1	MEM.NOP
AMX = 1	RAMX	MSC = F	INH CM
BEN = 0	NOP	QK = 0	NOOP
BMX = 7	RBMX	PCK = 0	NOOP
CCK = 0	NOOP	RMX = 0	RAMX_D RBMX_Q
CID = 1	UNUSED	SCK = 0	NOOP
DK = 0	NOOP	SGN = 0	NOOP
DT = 0	LONG	SHF = 0	ALU
EALU = 0	A	SI = 3	0 D_0 Q_0
EBMX = 0	FE	SMX = 0	EALU
FEK = 0	NOOP	SPO = 3B	WRITE RC TB
FS = 0	ENABLE MCT	SUB = 0	NOOP
IBC = 0	NOOP	VAK = 1	LOAD VA

E98 UWORD IN HEX = 0000003C0180C8003C000E99 UWORD ADDRESS = 0E98

KEY / 999999888888888877777777666666665555555544444444333333332222222211111111000000000000
 \ 54321098765432109876543210987654321098765432109876543210987654321098765432109876543210

BINARY = 000000000000000000000000000000001110000000001100000001100100000000000011100000000000000111010011001

ACF = 0	NOOP	IEK = 0	NOOP
ACM = 3	TBS	JMP = E99	
ADS = 1	PHYSICAL	KMX = 0	8
ALU = F	A	MCT = 19	READ.P
AMX = 0	LA	MSC = F	INH CM
BEN = 0	NOP	OK = 0	NOOP
BMX = 0	MASK	PCK = 0	NOOP
CCK = 0	NOOP	RMX = 0	RAMX_D RBMX_Q
CID = 1	UNUSED	SCK = 0	NOOP
DK = 0	NOOP	SGN = 0	NOOP
DT = 0	LONG	SHF = 0	ALU
EALU = 0	A	SI = 3	0 D_0 Q_0
EBMX = 0	FE	SMX = 0	EALU
FEK = 0	NOOP	SPO = 0	NOOP
FS = 0	ENABLE MCT	SUB = 0	NOOP
IBC = 0	NOOP	VAK = 0	NOOP

E99 UWORD IN HEX = 0811003401E009783C000E9A UWORD ADDRESS = E99

KEY / 999999888888888877777777666666665555555544444444333333332222222211111111000000000000
 \ 543210987654321098765432109876543210987654321098765432109876543210987654321098765432109876543210

BINARY = 0000100000100010000000000110100000000011100000000010010111000001110000000000000111010011010

ACF = 0	NOOP	IEK = 0	NOOP
ACM = 3	TBS	JMP = E9A	
ADS = 0	VIRTUAL	KMX = 0	8
ALU = D	A AND B	MCT = 1	MEM.NOP
AMX = 1	RAMX	MSC = F	INH CM
BEN = 0	NOP	OK = C	LOAD D
BMX = 4	LC	PCK = 0	NOOP
CCK = 0	NOOP	RMX = 0	RAMX_D RBMX_Q
CID = 1	UNUSED	SCK = 0	NOOP
DK = 8	LOAD SHF(INT FORM)	SGN = 0	NOOP
DT = 0	LONG	SHF = 0	ALU
EALU = 0	A	SI = 3	0 D_0 Q_0
EBMX = 0	FE	SMX = 0	EALU
FEK = 0	NOOP	SPO = 2F	LOAD LC TF
FS = 0	ENABLE MCT	SUB = 0	NOOP
IBC = 0	NOOP	VAK = 0	NOOP

E9A UWORD IN HEX = 00141D38018008003E0004CF UWORD ADDRESS = 0E9A

KEY / 999999888888888777777776666666665555555544444444333333322222222111111110000000000
 \ 54321098765432109876543210987654321098765432109876543210987654321098765432109876543210

BINARY = 00000000000101000001101001100000000011000000000001000000000000111100000000000010011001111

ACF = 0	NOOP	IEK = 0	NOOP
ACM = 3	TBS	JMP = 4CF	
ADS = 0	VIRTUAL	KMX = 0	8
ALU = E	B	MCT = 1	MEM.NOP
AMX = 0	LA	MSC = F	INH CM
BEN = 1D	TRANSLATION TEST	QK = 0	NOOP
BMX = 5	PC	PCK = 0	NOOP
CCK = 0	NOOP	RMX = 0	RAMX_D RBMX_Q
CID = 1	UNUSED	SCK = 0	NOOP
DK = 0	NOOP	SGN = 0	NOOP
DT = 0	LONG	SHF = 0	ALU
EALU= 0	A	SI = 3	0 D_0 Q_0
EBMX= 0	FE	SMX = 0	EALU
FEK = 0	NOOP	SPO = 0	NOOP
FS = 0	ENABLE MCT	SUB = 0	NOOP
IBC = 0	NOOP	VAK = 1	LOAD VA

4CF UWORD IN HEX = 0C10003A41803D683C820001 UWORD ADDRESS = 04CF

KEY / 99999988888888877777776666666665555555544444444333333322222222111111110000000000
 \ 54321098765432109876543210987654321098765432109876543210987654321098765432109876543210

BINARY = 00001100000100000000000001101001000001100000000011101011010000011110010000010000000000000001

ACF = 0	NOOP	IEK = 0	NOOP
ACM = 3	TBS	JMP = 1	
ADS = 0	VIRTUAL	KMX = 10	80
ALU = E	B	MCT = 7	LOCKWRITE.V.XCHK
AMX = 0	LA	MSC = F	INH CM
BEN = 0	NOP	QK = 0	NOOP
BMX = 4	LC	PCK = 0	NOOP
CCK = 0	NOOP	RMX = 0	RAMX_D RBMX_Q
CID = 7	ID REG_ID BUS-ID ADR=KMX	SCK = 1	LOAD SC
DK = C	LOAD Q	SGN = 0	NOOP
DT = 0	LONG	SHF = 0	ALU
EALU= 0	A	SI = 3	0 D_0 Q_0
EBMX= 0	FE	SMX = 2	ALU(9:0)
FEK = 0	NOOP	SPO = 2D	LOAD LC TD
FS = 1	ENABLE CID	SUB = 2	RETURN
IBC = 0	NOOP	VAK = 0	NOOP

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E8C UWORD IN HEX = 00101D3801800971020004AF UWORD ADDRESS = 0E8C

KEY / 99999988888888877777777666666666555555555444444443333333222222221111111110000000000
 \ 54321098765432109876543210987654321098765432109876543210987654321098765432109876543210

 BINARY = 0000000000010000001101001100000000001100000000000100101100010000010000000000001001010111

ACF = 0	NOOP	IEK = 0	NOOP
ACM = 3	TBS	JMP = 4AF	
ADS = 0	VIRTUAL	KMX = 0	8
ALU = E	B	MCT = 1	MEM.NOP
AMX = 0	LA	MSC = 0	NOOP
BEN = 1D	TRANSLATION TEST	QK = 0	NOOP
BMX = 4	LC	PCK = 1	PC_VA
CCK = 0	NOOP	RMX = 0	RAMX_D RBMX_Q
CID = 1	UNUSED	SCK = 0	NOOP
DK = 0	NOOP	SGN = 0	NOOP
DT = 0	LONG	SHF = 0	ALU
EALU= 0	A	SI = 3	0 D_0 Q_0
EBMX= 0	FE	SMX = 0	EALU
FEK = 0	NOOP	SPO = 2E	LOAD LC TE
FS = 0	ENABLE MCT	SUB = 0	NOOP
IBC = 0	NOOP	VAK = 1	LOAD VA

4AF UWORD IN HEX = 0C10003A41803D6800820001 UWORD ADDRESS = 04AF

KEY / 999999888888888777777776666666665555555554444444433333333222222221111111110000000000
 \ 54321098765432109876543210987654321098765432109876543210987654321098765432109876543210

 BINARY = 0000110000010000000000000011010010000011000000000111010110100000000001000001000000000000001

ACF = 0	NOOP	IEK = 0	NOOP
ACM = 3	TBS	JMP = 1	
ADS = 0	VIRTUAL	KMX = 10	80
ALU = E	B	MCT = 7	LOCKWRITE.V.XCHK
AMX = 0	LA	MSC = 0	NOOP
BEN = 0	NOP	QK = 0	NOOP
BMX = 4	LC	PCK = 0	NOOP
CCK = 0	NOOP	RMX = 0	RAMX_D RBMX_Q
CID = 7	ID REG_ID BUS-ID ADR=KMX	SCK = 1	LOAD SC
DK = C	LOAD Q	SGN = 0	NOOP
DT = 0	LONG	SHF = 0	ALU
EALU= 0	A	SI = 3	0 D_0 Q_0
EBMX= 0	FE	SMX = 2	ALU(9:0)
FEK = 0	NOOP	SPO = 2D	LOAD LC TD
FS = 1	ENABLE CID	SUB = 2	RETURN
IBC = 0	NOOP	VAK = 0	NOOP

B61 UWORD IN HEX = 301000380180616800820E68 UWORD ADDRESS = 0B61

KEY / 99999988888888877777777666666665555555444444433333332222222211111111000000000000
 \ 54321098765432109876543210987654321098765432109876543210987654321098765432109876543210

BINARY = 001100000001000000000000000111000000000011000000001100001011010000000000100000100000111001101000

ACF = 0	NOOP	IEK = 0	NOOP
ACM = 3	TBS	JMP = E68	
ADS = 0	VIRTUAL	KMX = 0	8
ALU = E	B	MCT = C	READ.V.NEWPC
AMX = 0	LA	MSC = 0	NOOP
BEN = 0	NOP	QK = 0	NOOP
BMX = 4	LC	PCK = 0	NOOP
CCK = 0	NOOP	RMX = 0	RAMX_D RBMX_Q
CID = 4	IDBUS_ID REG-ID ADR=SC 5:0	SCK = 1	LOAD SC
DK = 0	NOOP	SGN = 0	NOOP
DT = 0	LONG	SHF = 0	ALU
EALU= 0	A	SI = 3	0 D_0 Q_0
EBMX= 0	FE	SMX = 2	ALU(9:0)
FEK = 0	NOOP	SPO = 2D	LOAD LC TD
FS = 0	ENABLE MCT	SUB = 0	NOOP
IBC = 3	START	VAK = 0	NOOP

E68 UWORD IN HEX = 00100038B9F02D6102000E69 UWORD ADDRESS = 0E68

KEY / 9999998888888887777777666666665555555444444433333332222222211111111000000000000
 \ 54321098765432109876543210987654321098765432109876543210987654321098765432109876543210

BINARY = 00000000000100000000000000011100010111001111000001011010100001000000000000111001101001

ACF = 0	NOOP	IEK = 0	NOOP
ACM = 3	TBS	JMP = E69	
ADS = 0	VIRTUAL	KMX = 2E	19
ALU = E	B	MCT = 5	WRITE.V.NOCHK
AMX = 0	LA	MSC = 0	NOOP
BEN = 0	NOP	QK = E	LOAD ID BUS
BMX = 4	LC	PCK = 1	PC_VA
CCK = 0	NOOP	RMX = 0	RAMX_D RBMX_Q
CID = 5	ID BUS_ID REG-ID ADR=KMX	SCK = 0	NOOP
DK = 0	NOOP	SGN = 0	NOOP
DT = 0	LONG	SHF = 0	ALU
EALU= 0	A	SI = 3	0 D_0 Q_0
EBMX= 0	FE	SMX = 0	EALU
FEK = 0	NOOP	SPO = 2C	LOAD LC TC
FS = 1	ENABLE CID	SUB = 0	NOOP
IBC = 0	NOOP	VAK = 1	LOAD VA

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224 UWORD IN HEX = C001C03C0180F8DC40700062 UWORD ADDRESS = 0224

KEY / 9999998888888887777777766666666555555554444444433333333222222211111111000000000000
 \ 54321098765432109876543210987654321098765432109876543210987654321098765432109876543210

BINARY = 1100000000000000111000000011100000000110000001111000110111000100000011100000000001100010

ACF = 0	NOOP	IEK = 1	ISTR
ACM = 3	TBS	JMP = 62	
ADS = 1	PHYSICAL	KMX = 0	8
ALU = F	A	MCT = 1F	ALLOW.IB.READ
AMX = 1	RAMX	MSC = 0	NOOP
BEN = 0	NOP	QK = 0	NOOP
BMX = 0	MASK	PCK = 4	PC..PC+1
CCK = 7	INST DEP	RMX = 0	RAMX_D RBMX_Q
CID = 7	ID REG_ID BUS-ID ADR=KMX	SCK = 0	NOOP
DK = 0	NOOP	SGN = 0	NOOP
DT = 3	INST DEP.	SHF = 0	ALU
EALU= 0	A	SI = 3	0 D=0 Q=0
EBMX= 0	FE	SMX = 0	EALU
FEK = 0	NOOP	SPO = 1B	WRITE RA, RB[PRN]
FS = 0	ENABLE MCT	SUB = 0	NOOP
IBC = C	CLR B0	VAK = 0	NOOP

; PCS,MCR[363,2043]			16:51 7-DEC-1977			MICRO 31(254)		STAR Microcode: PCS C1,	
; Ucode Loc'n			Location / Line		Number	Index			
	0	1	2	3	4	5	6	7	
U 0000	3033:	3037:	3043:	3046:	3049:	3052:	3055:	3061:	
U 0008	3067:	3071:	3076:	3081:	3085:	3094:	5730=	3098:	
U 0010	17405=	3058	17723=	17453:	3106:	3109:	3112:	3115:	
U 0018	3118:	3124:	3127:	3132:	3135:	3138:	5733=	3145:	
U 0020	3841=	3845=	3101	11224=	21613:	13334=	16702=	16705=	
U 0028	4738=	4741=	21476=	21482=	4744=	13338=	3308:	3299:	
U 0030	3162:	11379=	17727=	17390:	3165:	11383=	16708=	16710=	
U 0038	3172:	18700=	5969=	18705=	21592:	21595:	19949=	19952=	
U 0040	5884:	12670:	6677:	17469:	5894:	17568:	6710:	17738:	
U 0048	9785:	10818:	10419:	17501:	17522:	3399:	3410:	3405:	
U 0050	8063=	5655=	13447=	22346=	8538=	5659=	17749=	17752=	
U 0058	12941=	17618=	3169	22353=	7189=	17940=	7193=	17945=	
U 0060	3181:	3184:	3187:	11229=	3205	3233=	5741=	3237=	
U 0068	5243=	6203=	5249=	6209=	3089:	6212=	5746=	6215=	
U 0070	8067=	8070=	13452=	3209	8545=	8552=	3355	17755=	
U 0078	12946=	11434=	13458=	6218=	5940=	11437=	5750=	17949=	
U 0080	3250:	3419:	3352:	3422:	3261:	3425:	3431:	3428:	
U 0088	18736:	18861:	3436:	17813:	3447:	18114:	3453:	3457:	
U 0090	3216=	3219=	3224=	3230=	3193=	3197=	4270=	3200=	
U 0098	17982=	17986=	17989=	17993=	17368=	18195=	4275=	18198=	
U 00A0	3945=	3948=	9264=	13122=	5173=	5177=	3358	14004=	
U 00A8	18741:	3343:	15375=	3380	5183=	5188=	3332:	3338:	
U 00B0	13674=	17641=	9270=	13126=	8095=	8101=	4351=	14008=	
U 00B8	10209=	3414	15380=	17996=	10213=	18761=	4354=	18764=	
U 00C0	3274:	10269:	24792:	24810:	3287:	17553:	3441	4551=	
U 00C8	3367:	3386:	3390:	3509	3394:	3372:	3376:	4555=	
U 00D0	3651=	3656=	4051=	4054=	3662=	3668=	3672=	3676=	
U 00D8	6000=	18613=	12934=	18619=	17373=	19004=	12937=	19008=	
U 00E0	3311=	3314=	3318=	3323=	3516	3728=	5665=	3731=	
U 00E8	5373=	3852=	5378=	3856=	6757=	3860=	5669=	3863=	
U 00F0	13678=	13680=	9274=	13131=	9773=	9776=	16613=	14016=	
U 00F8	13686=	12987=	15385=	18623=	6761=	12990=	6764=	24462:	
U 0100	8202:	22196:	22274:	22140:	22401:	22045:	21620:	24025:	
U 0108	24017:	21363=	8834=	21368=	24009:	23949:	21693:	23927:	
U 0110	17407=	24763:	3522	17457:	10880=	3549	4213=	4219=	
U 0118	3575	18651=	8844=	18657=	21322=	21328=	21333=	21338=	
U 0120	24499:	24568:	24639:	24658:	24681:	24694:	15936=	24470:	
U 0128	3580	24716:	24729:	3685	15601=	3991=	15624=	3994=	
U 0130	13841=	15365=	17731=	17460:	13843=	5229=	15941=	5233=	
U 0138	4766=	4770=	5974=	18661=	4773=	3689	5980=	5982=	
U 0140	14913=	12674:	5428=	5435=	5898:	18478=	4293=	4300=	
U 0148	15164=	21409=	10422:	21414=	5903:	5906:	5911:	5914:	
U 0150	5415=	5418=	15837=	17472:	3695	17572:	5364=	5368=	
U 0158	5422=	17620=	16721=	17504:	17524:	21642=	16723=	21646=	
U 0160	14922=	3699	5625=	3978=	3705	18483=	5629=	3982=	
U 0168	15169=	10587=	3735	3986=	10593=	10598=	7645=	7648=	
U 0170	14926=	15369=	15839=	17474:	10884=	13737=	15947=	17758=	
U 0178	22650=	22654=	22659=	22664=	5945=	13741=	5951=	5953=	

; PCS.MCR[363,2043]			16:51 7-DEC-1977		MICRO 31(254)		STAR Microcode: PCS 01, Location / Line Number Index			
;	Ucode	Loc'n	0	1	2	3	4	5	6	7
U 0180	5440=	4404=	6838=	6845=	5443=	5447=	6852=	6859=		
U 0188	10608=	4407=	6864=	6870=	10614=	14779=	3795	14783=		
U 0190	11555=	3849	6876=	6881=	3894	14499=	8783=	14509=		
U 0198	13493=	13496=	6885=	6889=	13504=	13507=	8788=	14787=		
U 01A0	15981=	4442=	15952=	6893=	3904	5301=	5758=	5305=		
U 01A8	10698=	4448=	18992=	6897=	10702=	14938=	5764=	14941=		
U 01B0	15986=	17643=	15957=	6901=	13603=	16829=	13606=	14516=		
U 01B8	15995=	15999=	18997=	6905=	3908	16831=	5769=	14944=		
U 01C0	5330=	10273:	5335=	5134=	11699=	11704=	16618=	5139=		
U 01C8	4334=	4341=	19013=	4091=	4096=	4100=	4105=	4110=		
U 01D0	4657=	4662=	5340=	5145=	18425=	4006	16622=	5150=		
U 01D8	6005=	21440=	19017=	21444=	6010=	6012=	6016=	6017=		
U 01E0	3712=	3715=	3719=	3725=	4223=	4228=	4234=	4239=		
U 01E8	8217=	6234=	15586=	6239=	19810=	6242=	15589=	6245=		
U 01F0	11559=	11562=	15962=	4057	18430=	18434=	16628=	14521=		
U 01F8	8235=	4061	4197	6248=	19818=	21785=	15591=	21791=		
U 0200	3472:	3475:	3481:	3484:	3489:	3498:	3505:	3525:		
U 0208	3530:	3534:	3540:	3544:	3556:	3567:	4038:	3572:		
U 0210	3798=	3801=	3805=	3811=	3585=	3588=	3591:	3594:		
U 0218	3597:	3603:	3606:	3612:	3615:	3618:	4331:	3625:		
U 0220	6196:	6279:	4360	3788:	3495:	6690=	3512:	3780:		
U 0228	7120:	7154:	5488=	5493=	5402:	5162:	6748:	5962:		
U 0230	3826=	3829=	3833=	3838=	4250=	6693=	4255=	4260=		
U 0238	22684=	22688=	22693=	22697=	22984=	22990=	22996=	23002=		
U 0240	5933:	4086:	6727:	7659:	5923:	7623:	6734:	7552:		
U 0248	3890:	4023:	4030:	4129:	4119:	3873:	3882:	7444:		
U 0250	5388=	4368	5392=	7663:	4372	7627:	5634=	5638=		
U 0258	22801=	22807=	22812=	22816=	23098=	23103=	23108=	23114=		
U 0260	15224=	15228=	15230=	15233=	4305=	4310=	4316=	4321=		
U 0268	15238=	15241=	15246=	15248=	3561:	4416	4641:	4647:		
U 0270	5474=	5478=	4383=	4389=	12693=	12696=	4395=	4400=		
U 0278	5482=	4422	4425	23471=	3635:	3638:	3642:	23475=		
U 0280	5453=	5457=	14370=	14626=	18386:	4079:	4134:	3630:		
U 0288	21755:	17921:	17966:	4002:	4068:	4073:	3915:	3901:		
U 0290	12894=	4432	14374=	14631=	5122=	5123=	5124=	5125=		
U 0298	4437	17924:	17970:	4462	13578=	23190=	17428=	23193=		
U 02A0	5348=	5263=	5353=	5269=	6787=	5273=	16765=	5279=		
U 02A8	3823:	4541	14840=	14844=	14145=	14149=	16768=	3768:		
U 02B0	4546	5310=	5358=	5315=	6790=	5319=	16771=	5323=		
U 02B8	9859=	4011=	14847=	4014=	13583=	23319=	17431=	23323=		
U 02C0	3746:	7638:	5538=	5543=	3757:	7671:	4563	19053:		
U 02C8	8123=	8127=	8128=	8132=	7508:	7571:	3958:	3925:		
U 02D0	4576	7642:	4983=	4987=	7375=	7675:	4991=	4994=		
U 02D8	8133=	8138=	6492=	8142=	7380=	23335=	6498=	23340=		
U 02E0	5497=	6378=	8647=	6382=	5500=	5503=	8652=	19056:		
U 02E8	14822=	4709=	8658=	4712=	14826=	4715=	4614	4718=		
U 02F0	12899=	4637	14378=	14636=	14268=	14271=	8894=	19059:		
U 02F8	9865=	9868=	9871=	9876=	13586=	4699	8899=	19063:		

; PCS,MCR[363,2043]			16:51 7-DEC-1977			MICRO 31(254)		STAR Microcode: PCS v1,		
; Ucode Loc'n		0	1	2	3	4	5	Location / Line	Number	Index
;	;	;	;	;	;	;	;	;	;	;
U 0300		4795:	4798:	4803:	4806:	4810:	4812:	4824:	4842:	
U 0308		4847:	4851:	4857:	4861:	4872:	4883:	4753:	4887:	
U 0310		5601=	5607=	15644=	15648=	490v:	4903:	4906:	49v9:	
U 0318		4912:	4917:	4920:	4925:	4928:	4931:	4758:	4938:	
U 0320		5612=	5617=	4706	6339=	4815:	7125=	4831:	6345=	
U 0328		15391=	10068=	11284=	10076=	15396=	10081=	11288=	10096=	
U 0330		4734	21500=	15653=	21506=	5508=	7129=	5511=	5514=	
U 0338		10325=	21510=	15618=	21513=	14528=	14531=	15621=	10101=	
U 0340		13666:	4971:	13443:	4287:	4977:	4607:	4455:	19363:	
U 0348		8736:	4160:	4179:	417v:	4207:	4193:	8532:	24845:	
U 0350		5080=	5081=	5082=	5083=	5084=	5085=	5086=	5087=	
U 0358		5643=	5646=	15627=	24067=	14552=	14555=	15631=	24070=	
U 0360		7164=	6508=	13321=	6513=	5674=	5679=	13323=	4566=	
U 0368		8743:	8749:	13327:	4762	4877:	4779	4828	4569=	
U 0370		7168=	6554=	15656=	6559=	5521=	4834	5526=	5531=	
U 0378		10331=	10334=	10337=	10343=	4946:	4949:	4957:	4960:	
U 0380		5466:	5199:	6367:	4726:	8053:	24804:	24826:	4943:	
U 0388		5563:	5297:	6781:	7182:	7140:	6312:	5993:	6226:	
U 0390		5777=	5780=	4839	4730:	4866	8638=	24830:	8642=	
U 0398		6260=	15968=	6262=	7186:	7143:	15971=	24452=	24456=	
U 03A0		5089=	5090=	5091=	5092=	5093=	5094=	5095=	5096=	
U 03A8		19829=	10108=	16477=	10112=	19837=	10116=	16480=	10121=	
U 03B0		5101=	5102=	5103=	5104=	5105=	5106=	5107=	5108=	
U 03B8		3928=	3931=	3935=	3941=	6295=	6297=	4890	10127=	
U 03C0		4187:	5830:	24786:	11218:	4511:	7848:	11547:	4895	
U 03C8		24819:	5724:	14763:	15354:	16588:	15932:	18474:	18339:	
U 03D0		6300=	6303=	5000	11220:	4517:	4523:	4529:	4535:	
U 03D8		6329=	6331=	14767:	15359:	24485=	24488=	24491=	24494=	
U 03E0		6355=	6357=	5004	7426=	6621=	6627=	11550:	7431=	
U 03E8		3961=	3964:	3968=	3974:	6592=	15211=	6597=	15215=	
U 03F0		5111=	5112=	5113=	5114=	5115=	5116=	5117=	5118=	
U 03F8		5010	7559=	14772:	7562=	6610=	5015	6613=	15219=	
U 0400		8353:	8356:	8359:	8362:	8368:	8377:	8383:	8392:	
U 0408		8399:	8403:	8408:	8411:	8420:	8430:	5142	8434:	
U 0410		10889=	5167	5593=	5596=	8447:	8450:	8453:	8456:	
U 0418		8459:	8464:	8472:	8478:	8481:	8484:	7680=	7684=	
U 0420		6950=	24697=	6954=	16021=	8374:	18922=	8389:	16025=	
U 0428		6911=	6914=	17672=	16029=	7008=	7012=	17674=	22827=	
U 0430		5225	24700=	6386=	6388=	7604=	18925=	13546=	16032=	
U 0438		24707=	24710=	5238	16036=	7610=	18928=	13549=	22832=	
U 0440		7041=	7047=	13989:	14355:	18935=	18949=	14930=	23026=	
U 0448		24799:	7595:	9142:	7599=	7051=	7054=	9161:	23031=	
U 0450		10893=	10896=	10899=	10904=	18938=	18952=	14934=	23036=	
U 0458		4465=	4468=	4472=	4479=	18943=	18957=	9168:	23042=	
U 0460		12534=	4484=	17838=	4487=	5252	4490=	17843=	4494=	
U 0468		12537=	4498=	9145:	4502=	8424:	5257	7798=	7800=	
U 0470		7386=	7389=	7692=	7697=	6970=	5285	6975=	7700=	
U 0478		4588=	4591=	4595=	4600=	8494:	8497:	8350:	8503:	

; PCS,MCR[363,2043]			16:51 7-DEC-1977			MICRO 31(254)		STAR Microcode: PCS 01,		
; Ucode Loc'n		0	1	2	3	4	5	Location / Line Number	Index	
;	;	;	;	;	;	;	;	;	;	
U 0480		8698:	8693:	8672:	10502:	12888:	13116:	10303:	8489:	
U 0488		9851:	13106:	10872:	24834:	13994=	17611=	8682:	8685:	
U 0490		10169=	12591=	5383	10506:	10172=	12907=	14134=	4579=	
U 0498		10175=	12595=	10875:	24840:	10178=	12911=	14139=	4582=	
U 04A0		4617=	4620=	4624=	4631=	7854=	18963=	7769=	7772=	
U 04A8		4640=	4643=	4646=	4649=	7075=	17613=	7078=	23163=	
U 04B0		7267=	5407	7274=	8245=	7857=	18966=	7865=	8250=	
U 04B8		4665=	4668=	4671=	4674=	7282=	18971=	7286=	23167=	
U 04C0		17634=	14620:	10486:	5410	18866=	13903:	8291=	8294=	
U 04C8		4681=	4685=	4689=	4692=	7294=	15203=	7300=	23258=	
U 04D0		5020=	5023=	5028=	5033=	7749=	7752=	7755=	7758=	
U 04D8		6523=	6531=	6539=	6547=	7325=	15205=	7331=	23262=	
U 04E0		17637=	8177=	10490:	8182=	18871=	8706=	10307:	8710=	
U 04E8		9854:	5840=	5469	5843=	13998=	5847=	5548	5850=	
U 04F0		7354=	5552	7357=	9015=	7585=	7589=	10310:	9018=	
U 04F8		8507=	6030=	8511=	6035=	8774=	6040=	8777=	6045=	
U 0500		19072=	5569	19076=	19080=	7780=	7783=	5204=	5208=	
U 0508		19084=	19088=	19092=	19096=	19102=	19106=	5213=	5218=	
U 0510		19112=	19116=	19120=	19124=	19127=	19131=	5786=	5790=	
U 0518		19139=	19143=	19147=	19152=	19155=	19158=	5794=	5798=	
U 0520		19164=	19168=	19172=	19175=	19180=	19183=	14256=	6089=	
U 0528		19189=	19193=	19196=	19199=	19203=	19207=	14260=	6093=	
U 0530		19215=	19219=	19223=	19227=	19231=	19235=	19238=	6097=	
U 0538		19246=	19249=	19252=	19255=	19259=	19263=	19267=	6099=	
U 0540		19385=	5622	19389=	19393=	7812=	7814=	7087=	7091=	
U 0548		19400=	19406=	19411=	19417=	19425=	19431=	7095=	7099=	
U 0550		19439=	19445=	19450=	19455=	19460=	19464=	15019=	7104=	
U 0558		19471=	19475=	19478=	19482=	19485=	19488=	15024=	7108=	
U 0560		19494=	19497=	19501=	19505=	19510=	19513=	15540=	7488=	
U 0568		19519=	19523=	19526=	19529=	19533=	19537=	15543=	7492=	
U 0570		19545=	19549=	19553=	19557=	19561=	19564=	19570=	7533=	
U 0578		19580=	19586=	19592=	19595=	19599=	19605=	19608=	7537=	
U 0580		6798=	6803=	6807=	6811=	5573=	15507=	5579=	5584=	
U 0588		14361=	6283=	5650	6285=	5652	6287=	5588=	6289=	
U 0590		14793=	5801	5855=	5859=	16733=	15510=	5861=	5864=	
U 0598		7959=	7964=	5868=	5872=	9223=	7973=	9230=	7976=	
U 05A0		16938=	18979=	6058=	6061=	7999=	8002=	6064=	6067=	
U 05A8		8025=	8028=	6070=	6073=	8281=	8284=	9060=	9064=	
U 05B0		16942=	18982=	6817=	6822=	16738=	9195=	7870=	9204=	
U 05B8		11591=	18987=	7449=	7452=	9589=	9595=	7875=	7879=	
U 05C0		24683=	13139=	5805	6106=	9242=	5810	9247=	6109=	
U 05C8		9381=	13142=	9389=	6111=	10157=	10160=	10163=	10166=	
U 05D0		24686=	6121=	14166=	6123=	5835	6126=	14171=	6129=	
U 05D8		24688=	9394=	14175=	9398=	9420=	6077	9425=	6132=	
U 05E0		6079	6140=	14200=	6142=	6083	6145=	14203=	6148=	
U 05E8		14366=	10011=	14207=	10015=	9492=	6085	9498=	6150=	
U 05F0		14797=	6156=	6101	6159=	16743=	6162=	16636=	6165=	
U 05F8		11595=	11598=	11601=	11604=	9671=	9677=	16640=	6168=	

; PCS,MCR[363,2043]			16:51 7-DEC-1977			MICRO 31(254)		STAR microcode: PCS v1,		
						Location / Line		Number	Index	
Ucode	Loc'n	0	1	2	3	4	5	6	7	
U 0600		19366=	6173=	16593=	6175=	6103	6178=	17798=	6181=	
U 0608		7203=	7208=	7213=	7218=	9881=	9884=	17800=	6183=	
U 0610		7456=	6113	7460=	7465=	8558=	8563=	8569=	8572=	
U 0618		9524=	6316=	9532=	6318=	9645=	6320=	9653=	6323=	
U 0620		19369=	6116	14024=	6394=	9765=	6134	9770=	6396=	
U 0628		9966=	9969=	14029=	6400=	10194=	10197=	10201=	10204=	
U 0630		19372=	14389=	14651=	6406=	10350=	10355=	6136	6409=	
U 0638		19376=	14391=	14654=	6413=	11259=	11263=	11266=	11269=	
U 0640		10576=	10580=	16778=	6419=	10632=	10637=	10780=	6421=	
U 0648		10784=	10787=	16783=	6425=	6199	11308=	10787=	11311=	
U 0650		7472=	6230	7478=	7483=	8593=	8598=	8603=	8606=	
U 0658		10806=	10809=	6430=	6433=	10527=	6256	10531=	6436=	
U 0660		17056=	6634=	16599=	6639=	6265	6645=	18562=	6651=	
U 0668		7516=	6268	7522=	7527=	10909=	10912=	18567=	6655=	
U 0670		17060=	10054=	16602=	10059=	8755=	8759=	8765=	8768=	
U 0678		10917=	10921=	6987=	6993=	10975=	10979=	6281	6999=	
U 0680		7824=	7828=	7832=	6314	8851=	8855=	8860=	8863=	
U 0688		11275=	7905=	11279=	7910=	11370=	7916=	11374=	7921=	
U 0690		11387=	7934=	11390=	7939=	6349	7944=	21802=	7948=	
U 0698		7884=	7887=	7891=	7898=	10984=	10988=	21807=	7952=	
U 06A0		11001=	11005=	16644=	7983=	11011=	11014=	6352	7990=	
U 06A8		11068=	11071=	16647=	7994=	11126=	11130=	11362=	11365=	
U 06B0		8011=	6373	8015=	8019=	11299=	11303=	9291=	9296=	
U 06B8		11581=	11585=	8032=	8035=	11644=	11654=	8038=	8042=	
U 06C0		8104=	8107=	8111=	8117=	9303=	9307=	9315=	9322=	
U 06C8		11775=	11778=	6457	9439=	11785=	11791=	6465	9448=	
U 06D0		11841=	11848=	8150=	8154=	11856=	11860=	9802=	9806=	
U 06D8		8994=	10650=	8999=	10656=	11959=	11963=	9810=	9814=	
U 06E0		9330=	9335=	9341=	9346=	9352=	9359=	9367=	9374=	
U 06E8		12684=	9945=	12688=	9949=	13055=	9953=	13057=	9957=	
U 06F0		12073=	12078=	9211=	9216=	12106=	12109=	9479=	9484=	
U 06F8		13803=	9984=	13807=	9988=	13928=	9992=	13932=	9995=	
U 0700		20787:	20564:	20572:	20586:	20608:	20621:	20639:	20649:	
U 0708		20791:	20568:	20575:	20603:	20611:	20629:	20645:	20653:	
U 0710		18000=	20405:	20415:	20446:	20454:	20471:	20499:	20512:	
U 0718		18003=	20411:	20435:	20450:	20457:	20481:	20503:	20516:	
U 0720		6471	21669:	21674:	21167=	19976:	20038:	9576=	9580=	
U 0728		9455=	9462=	9469=	21172=	12122=	12127=	17650=	20844:	
U 0730		19985:	6476	9752=	9757=	19988:	9505=	6482	9510=	
U 0738		19995:	10667=	20420:	10670=	19998:	6503	17652=	20746:	
U 0740		12150=	12154=	17762=	9543=	12222=	12227=	9551=	9559=	
U 0748		14035=	10390=	14038=	10394=	14048=	10398=	14052=	10403=	
U 0750		20073:	20241:	17765=	20158:	20024:	6565	6568	20292:	
U 0758		20308:	6572	20432:	10618=	12262=	12265=	20224:	10623:	
U 0760		20005:	20008:	20011:	6578	20799:	9634=	21196=	9639=	
U 0768		6602	20795:	11745=	11749=	12282=	12285=	21201=	11753=	
U 0770		9613=	6661	9623=	9627=	20733:	6665	6668	11797=	
U 0778		6680	20763:	20423:	6683	20523:	20526:	20531:	11801=	

; PCS,MCR[363,2043]			16:51 7-DEC-1977			MICRO 31(254)		STAR Microcode: PCS 01,		
						Location / Line		Number	Index	
;	Ucode	Loc'n	0	1	2	3	4	5	6	7
U 0780	12296	12301	6697	11872	12313	12317	6702	11880		
U 0788	21679	6713	6717	11889	12354	12359	6738	11893		
U 0790	21664	6751	10746	10751	12363	12369	6768	11904		
U 0798	21684	10775	6773	10780	12375	12379	6920	11909		
U 07A0	20049	20061	20064	9704	20067	20053	20057	9707		
U 07A8	21052	6925	20130	20106	20980	20930	21123	20850		
U 07B0	10549	6928	10554	10558	12413	12418	9660	9664		
U 07B8	20353	6934	6939	20345	20349	6945	20366	20755		
U 07C0	14102	10939	14106	10943	12426	12430	20810	20872		
U 07C8	20886	20818	6959	20826	20830	20897	20892	20864		
U 07D0	14291	20244	14294	20161	20520	20254	20171	20311		
U 07D8	20314	20183	6964	20210	6981	21689	20236	20267		
U 07E0	12462	12467	9889	9896	20807	7005	9903	9910		
U 07E8	7017	20803	11663	11668	12479	12483	11926	11932		
U 07F0	13312	13315	9916	9921	20736	7022	9926	9931		
U 07F8	14978	20774	14980	11968	14082	14086	7027	11971		
U 0800	11165	11168	11171	11175	14282	14285	7032	12026		
U 0808	11180	11186	7036	11190	14400	14405	7069	12031		
U 0810	17354	11343	17357	11346	14412	14416	7072	12037		
U 0818	18237	12139	18240	12144	14437	14443	7082	12040		
U 0820	14673	14678	12490	12500	14682	14685	9937	9940		
U 0828	15521	15525	7157	12273	15548	15551	7224	12278		
U 0830	15682	15684	7229	12322	16097	16101	7233	12327		
U 0838	16135	16138	7237	12332	16202	16205	7240	12338		
U 0840	12718	12721	12724	12731	16245	16248	9976	9979		
U 0848	17168	17171	12383	12391	17740	17743	7247	12398		
U 0850	12919	12926	7255	12929	17788	17791	10045	10048		
U 0858	17853	17857	12964	12968	18666	12547	18672	12550		
U 0860	10253	7260	10257	11233	10260	7309	10373	10377		
U 0868	12736	12743	12750	12753	12756	12761	12766	12769		
U 0870	17933	17937	13048	13051	17954	17957	10643	10646		
U 0878	19686	12814	19690	12818	19753	12823	19756	12828		
U 0880	17974	17977	13276	13279	18014	18017	10677	10680		
U 0888	18053	18058	13292	13295	19876	13001	19882	13005		
U 0890	18263	18268	13346	13349	18346	18350	10962	10965		
U 0898	18396	18402	7317	13032	18409	18415	7340	13035		
U 08A0	18452	18456	7348	13153	18574	18578	7362	13159		
U 08A8	18583	18589	7367	13162	18789	18793	13169	13172		
U 08B0	19323	19326	13355	13358	19338	19342	11029	11032		
U 08B8	19649	19653	7371	13177	19656	19659	7400	13182		
U 08C0	19702	19706	13364	13367	19931	11327	19934	11331		
U 08C8	21073	13530	21076	13538	19709	19713	13190	13192		
U 08D0	19796	19800	13786	13790	19858	19862	11335	11338		
U 08D8	19887	19892	7407	13201	20137	20140	7411	13204		
U 08E0	21715	21718	13832	13836	21874	21879	11350	11353		
U 08E8	23672	23676	13918	13922	23700	23703	13229	13234		
U 08F0	23795	23799	14062	14068	23804	23808	11722	11726		
U 08F8	23834	23839	13248	13251	21295	7416	21299	13256		

; PCS,MCR[363,2043]		16:51 7-DEC-1977			MICRO 31(254)		S1AR Microcode: PCS F1,		
; Ucode Loc'n		0	1	2	3	4	5	6	7
; U 0900		23845=	23848=	14429=	14433=	11759=	11762=	11765=	11768=
U 0908	21633=	14483=	21636=	14491=	23854=	23857=	13711=	13714=	
U 0910	21703=	7421	21709=	13721=	22562=	7497	22567=	13725=	
U 0918	23485=	7513	23489=	13730=	24144=	14299=	24147=	143v1=	
U 0920	7542	14538=	7556	14540=	23981=	23984=	7579	13768=	
U 0928	23996=	23999=	14853=	14857=	24231=	24236=	7689	13772=	
U 0930	11807=	11812=	11816=	11820=	11824=	11828=	11833=	11836=	
U 0938	24266=	24269=	14862=	14867=	24350=	24353=	14448=	14452=	
U 0940	24383=	24387=	14993=	14997=	7739	11916=	7743	11921=	
U 0948	24534=	24538=	15003=	15006=	14465=	14469=	14473=	14479=	
U 0950	24603=	24609=	7763	14875=	24615=	24619=	7776	14878=	
U 0958	24630=	24632=	7802	14883=	24650=	24653=	7806	14886=	
U 0960	24669=	24673=	15011=	15014=	24737=	24740=	11938=	11941=	
U 0968	24748=	24752=	15031=	15033=	7808	14901=	7838	14904=	
U 0970	15139=	15143=	7927	15146=	7980	8058	8074	14949=	
U 0978	8080	15193=	8084	15196=	8088	8143	8158	14953=	
U 0980	8163	8167	8172	14958=	8207	8210	8254	14960=	
U 0988	8271	8275	8297	14962=	8300	15099=	8303	15103=	
U 0990	15423=	15428=	15432=	15434=	8306	11980=	8310	11985=	
U 0998	8313	8318	15465=	15468=	8321	15131=	8324	15133=	
U 09A0	8329	8416	15497=	15500=	8437	12v49=	8442	12052=	
U 09A8	8469	8514	8518	15152=	8585	8611	8615	15156=	
U 09B0	8626	8702	12084=	12089=	8715	8719	12093=	12298=	
U 09B8	8791	8794	15819=	15822=	8797	15184=	8642	15188=	
U 09C0	16050=	16054=	16057=	16059=	8807	8811	12113=	12116=	
U 09C8	8815	8818	8821	15255=	8826	8872	8878	15257=	
U 09D0	8886	8905	16151=	16154=	8949	8916	8920	15450=	
U 09D8	8925	8928	16191=	16195=	8933	8938	8942	15453=	
U 09E0	8945	8949	16273=	16276=	8970	8976	9002	15457=	
U 09E8	9010	9013	16657=	16661=	9037	9041	9045	15459=	
U 09F0	9049	9054	9087	15481=	9092	9096	9148	15484=	
U 09F8	9152	9156	9180	15487=	9183	9188	9192	15490=	
U 0A00	9253	9278	16800=	16804=	9404	12161=	9412	12165=	
U 0A08	9517	9566	9603	15609=	9687	9713	9717	15612=	
U 0A10	9720	9749	9790	15739=	9793	9798	10007	15743=	
U 0A18	10019	10024	10027	15747=	10030	10033	15786=	15790=	
U 0A20	10038	10189	16809=	16812=	10217	10231	10248	15769=	
U 0A28	17510=	10313	17512=	17515=	10317	10321	10361	15772=	
U 0A30	10366	10384	17537=	17539=	10493	12170=	10497	12175=	
U 0A38	10520	10523	10536	15809=	10563	10602	10660	15813=	
U 0A40	18502=	18508=	18514=	10720	10724	10729	12437=	12440=	
U 0A48	18531=	18535=	18538=	10733	10739	10758	16084=	16087=	
U 0A50	18681=	18686=	18690=	10761	10766	10771	12445=	12450=	
U 0A58	10790	10794	10822	16122=	10826	10830	10833	16126=	
U 0A60	12774=	12781=	12789=	12792=	12796=	12801=	12805=	12808=	
U 0A68	18715=	18719=	18723=	18728=	10947	10953	16167=	16170=	
U 0A70	10958	10971	20115=	20119=	10996	11020	12833=	12838=	
U 0A78	11025	11039	11050	16178=	11054	11057	11064	16180=	

; PCS,MCR[363,2043]			16:51 7-DEC-1977			MICRO 31(254)		STAR Microcodes: PCS 01,	
; Ucode Loc'n		0	1	2	3	4	5	Number	Index
U	0A80	11082	11087	20176=	20180=	11091	11095	12952=	12955=
U	0A88	11100	11110	11115	16232=	11121	11140	11144	16236=
U	0A90	11148	11160	11239	13009=	11293	11315	11319	13012=
U	0A98	11322	11394	11397	16319=	11400	11403	11408	16322=
U	0AA0	11411	11419	11430	13040=	11566	11569	11573	13044=
U	0AA8	11577	11627	11633	16368=	11639	11658	11676	16372=
U	0AB0	11681	11687	20189=	20192=	11708	11712	11718	16405=
U	0AB8	11730	11736	20217=	20220=	11950	11974	11990	16407=
U	0AC0	11998	12003	20258=	20262=	12007	12014	12018	16413=
U	0AC8	12022	12043	20272=	20275=	12058	12133	12180	16416=
U	0AD0	12186	12191	12194	16444=	12199	12204	12211	16449=
U	0AD8	12216	12231	12235	16454=	17181=	17183=	17185=	17188=
U	0AE0	12238	12244	20283=	20286=	12250	13219=	12255	13222=
U	0AE8	12270	12291	12304	16486=	12309	12345	12350	16488=
U	0AF0	12402	12405	20358=	20361=	12458	16850=	12475	16853=
U	0AF8	12505	12509	20370=	20373=	12514	16856=	12523	16860=
U	0B00	12526	20749=	12530	20752=	12542	12553	12557	16865=
U	0B08	12561	20853=	12571	20856=	12577	12583	12587	16868=
U	0B10	12600	12603	20935=	20938=	12606	12610	12651	16984=
U	0B18	12655	12659	20984=	20988=	12679	12702	12708	16987=
U	0B20	21421=	21425=	12712	21432=	12978	12982	13015	16992=
U	0B28	13019	13022	21760=	21765=	13025	13059	13110	16995=
U	0B30	21817=	21821=	21825=	21829=	13134	13146	13240=	13243=
U	0B38	13195	17144=	13263	17146=	13266	17150=	13270	17154=
U	0B40	21851=	21856=	21861=	21864=	13286	13303	13306	17410=
U	0B48	22058=	22065=	22070=	22076=	13463	13482	13510	17412=
U	0B50	22154=	22159=	22164=	22170=	13469=	13553	13474=	13478=
U	0B58	22296=	22303=	22307=	22311=	13557	13565	17479=	17482=
U	0B60	22491=	22497=	22501=	22506=	13567	13569	13518=	13520=
U	0B68	22522=	22526=	22530=	13590	13592	17528=	13595	17530=
U	0B70	22704=	22708=	22713=	13598	13690	13717	17656=	17658=
U	0B78	23124=	23130=	23134=	23139=	13751	13755	17662=	17666=
U	0B80	23762=	23765=	23768=	13761	13794	13699=	13798	13743=
U	0B88	24242=	24245=	24249=	13810	13822	17829=	13825	17832=
U	0B90	24273=	24277=	24280=	24283=	13846	13907	13777=	13780=
U	0B98	14041	14072	14077	18184=	14159	14178	14181	18189=
U	0BA0	24291=	24295=	24298=	24303=	14186	14194	14211	18201=
U	0BA8	14217	14222	14232	14237	14241	14245	14249	18205=
U	0BB0	14275	14278	14385	14394	14420	14424	14544	18215=
U	0BB8	14643	14647	14661	14665	14668	14800	14825	18218=
U	0BC0	14808	14811	14815	13815=	14818	14828	14831	13819=
U	0BC8	14892	14897	14906	18227=	14973	15073	15076	18230=
U	0BD0	15079	15083	15093	15105	15108	15159	15399	18325=
U	0BD8	18287=	18292=	18297=	18302=	18305=	15402	15405	18328=
U	0BE0	15408	15436	15440	15444	15470	15472	14092=	14096=
U	0BE8	15476	15493	15528	15530	15534	18594=	15562	18599=
U	0BF0	15565	15568	15570	15573	15578	15596	14126=	14128=
U	0BF8	15659	15669	15672	18818=	15677	15688	15691	18825=

PCS, MCR[363,2043]			16:51 7-DEC-1977			MICRO 31(254)		STAR Microcode: PCS v1,		
Ucode Loc'n		0	1	2	3	4	5	Location / Line	Number	Index
6	7									
U 0C00		15758	15762	15777	15793	15797	15832	14561=	14564=	
U 0C08		15841	15845	15974	18838=	15976	16004	16008	19842=	
U 0C10		16039	16062	16065	16091	16105	14968=	16109	14971=	
U 0C18		16141	16145	16158	18877=	16161	16173	16183	18882=	
U 0C20		16198	16218	16221	16224	16256	16259	15047=	15050=	
U 0C28		16264	16268	16279	18893=	16282	16288	16290	18898=	
U 0C30		16294	16297	16311	16333	16349	15059=	16352	15065=	
U 0C38		16356	16359	16363	16389	16392	19679=	16395	19683=	
U 0C40		16399	16421	16439	16465	16469	15122=	16473	15127=	
U 0C48		16501	16503	16505	19896=	16507	16509	16666	19901=	
U 0C50		16675	16713	16717	16773	16791	16888	16891	20229=	
U 0C58		16894	16896	16899	16902	16917	16931	91771	20233=	
U 0C60		16935	16944	16964	16967	17016	17020	17023	19905=	
U 0C68		17048	17052	17079	17106	17135	17140	19908=	19912=	
U 0C70		17197	17223	17226	17229	17231	15174=	17235	15178=	
U 0C78		17239	17249	17276	17280	17291	17294	20297=	20302=	
U 0C80		17296	17299	17302	15262=	17304	17311	17314	15265=	
U 0C88		17317	17321	17324	17329	17336	17344	20324=	20329=	
U 0C90		17347	17351	17363	10516=	17393	17397	17399	20834=	
U 0C98		17401	17425	17433	17435	17438	17441	17444	20838=	
U 0CA0		17487	17532	17542	15270=	17546	17558	17578	15273=	
U 0CA8		17582	17607	17615	17625	17631	17645	20876=	20880=	
U 0CB0		17647	17681	17684	17686	17689	17694	21152=	21157=	
U 0CB8		17697	17700	17720	17802	17805	21771=	21162=	21775=	
U 0CC0		17816	17820	17824	17848	17882	17885	21182=	21186=	
U 0CC8		17890	17894	17897	23935=	17901	17904	21191=	23940=	
U 0CD0		17907	17911	17928	18011	18021	18025	18029	21215=	
U 0CD8		18040	18064	18096	18099	18117	18122	18126	21220=	
U 0CE0		18131	18147	18154	18157	18161	18168	15698=	15702=	
U 0CE8		18173	18179	18212	18222	21390=	21395=	21398=	21402=	
U 0CF0		18234	18243	18247	18254	18260	18279	18318	21488=	
U 0CF8		18322	18354	18357	18363	18367	18372	18377	21494=	
U 0D00		18391	18440	18443	18448	18459	18464	18487	21624=	
U 0D08		18491	18496	18523	18527	18608	18642	18646	21627=	
U 0D10		18677	18695	18711	15712=	18745	18749	18757	15716=	
U 0D18		18771	18775	18780	18785	22093=	22099=	22105=	22111=	
U 0D20		18799	18803	18808	15724=	18812	18832	18845	15729=	
U 0D28		18849	18854	18887	18906	22210=	22214=	22219=	22224=	
U 0D30		18910	18913	18917	15754=	19023	19027	19032	15756=	
U 0D38		19038	19041	19046	19276	22325=	22329=	22333=	22337=	
U 0D40		19280	19286	19290	19295	19298	15827=	19302	15829=	
U 0D48		19308	19314	19319	19333	22360=	22364=	22368=	22372=	
U 0D50		19347	19351	19357	19616	19620	24759:	16014=	16017=	
U 0D58		19626	19646	19663	19669	22628=	22632=	22637=	22642=	
U 0D60		19675	19699	19718	16071=	19721	19725	19730	16076=	
U 0D68		19734	19738	19744	19749	22774=	22780=	22786=	22792=	
U 0D70		19762	19778	19792	19805	19823	16327=	19843	16330=	
U 0D78		19848	19851	19855	19871	23436=	23440=	23444=	23450=	

PCS,MCR[363,2043]			16:51 7-DEC-1977			MICRO 31(254)		STAR Microcode: PCS 01,		
Ucode Loc'n		0	1	2	3	4	5	Location / Line Number	Index	
								6	7	
U 0D80		19915	19922	19927	19938	19942	19992	20002	23499=	
U 0D88		20027	20030	20034	20041	20044	20077	20081	23502=	
U 0D90		20084	20087	20091	20094	20097	16339=	20101	16343=	
U 0D98		20111	20122	20126	20134	23523=	23529=	23535=	23541=	
U 0DA0		20166	20198	20202	20206	20213	20249	20279	23595=	
U 0DAB		20319	20427	20440	20460	20463	20467	20474	23599=	
U 0DB0		20478	20484	20487	20491	20495	20508	20578	23684=	
U 0DB8		20583	20592	20597	20616	20626	20633	20695	23687=	
U 0DC0		20722	20741	20760	20768	20814	20822	20859	23817=	
U 0DC8		20867	20889	20912	20991	20996	21024	21027	23821=	
U 0DD0		21032	21101	21107	21110	21127	21130	16459=	16462=	
U 0DD8		21146	21177	21204	23957=	21210	21225	21230	23962=	
U 0DE0		21235	21271	21275	16492=	21279	21284	21290	16495=	
U 0DE8		21304	21309	21317	24361=	21342	21374	21379	24365=	
U 0DF0		21383	21448	21452	16513=	21457	21471	21518	16516=	
U 0DF8		21522	21525	21530	21535	21540	21545	16667=	16670=	
U 0E00		21549	21554	21559	21563	16682=	16687=	16690=	16694=	
U 0E08		21568	21572	21576	21580	21585	16749=	21600	16752=	
U 0E10		21605	21650	21653	21657	21723	16819=	21729	16822=	
U 0E18		21734	21737	16874=	16878=	21742	21781	16880=	16884=	
U 0E20		21797	21812	21834	16958=	16969=	16912=	16914=	16960=	
U 0E28		21838	21843	16922=	16924=	21847	21869	16926=	16929=	
U 0E30		21885	21890	21895	21899	21903	21907	16950=	16953=	
U 0E38		21910	21914	17001=	17005=	21917	21923	17007=	17011=	
U 0E40		21927	21931	22049	17074=	17028=	17031=	17034=	17076=	
U 0E48		22083	22144	17039=	17041=	22202	22232	17043=	17046=	
U 0E50		22236	22241	22280	22284	22268	22317	17066=	17069=	
U 0E58		22378	17112=	22382	17117=	22387	17119=	22408	17121=	
U 0E60		22412	22415	22420	22428	22478	17127=	22482	17130=	
U 0E68		22512	22518	22534	17159=	22538	22542	22557	17162=	
U 0E70		22677	22840	22845	22850	22856	22861	17193=	17195=	
U 0E78		22869	22875	23013	23050	23054	23059	17202=	17205=	
U 0E80		23064	23086	17211=	17214=	23091	23120	17217=	17220=	
U 0E88		23144	17254=	23149	17258=	23154	17260=	23173	17262=	
U 0E90		23176	23179	23184	23198	23209	17269=	23215	17272=	
U 0E98		23236	23243	23248	23284	23290	23305	17491=	17493=	
U 0EA0		23311	23328	23429	23455	17771=	17774=	17779=	17782=	
U 0EA8		23459	23465	17862=	17865=	23479	23506	17869=	17872=	
U 0EB0		23511	23516	23605	17876=	23610	23614	23619	17879=	
U 0EB8		23634	23637	23641	23645	23648	18044=	23651	18048=	
U 0EC0		23654	23657	23660	23664	18082=	18086=	18090=	18093=	
U 0EC8		23668	23692	23707	23711	23714	18103=	23718	18107=	
U 0ED0		23772	23776	23780	23784	23769	23812	18134=	18138=	
U 0ED8		23827	23864	23967	18272=	23971	23975	23990	18275=	
U 0EE0		24035	24073	24076	18310=	24081	24097	24100	18315=	
U 0EE8		24104	24137	24140	24150	18542=	18546=	18551=	18555=	
U 0EF0		24155	24161	24166	24170	24176	24182	19631=	19637=	
U 0EF8		24186	24189	24193	24198	24202	24205	19768=	19772=	

; PCS,MCR[363,2043]		16:51 7-DEC-1977			MICRO 31(254)		STAR Microcodes PCS 01,		
; Ucode Loc'n		0	1	2	3	4	5	Number	Index
U	0F00	24209	24213	24218	24223	24227	19783=	24255	19786=
U	0F08	24259	24262	24307	24311	20658=	20663=	20668=	20673=
U	0F10	24336	24340	24345	24370	20678=	20682=	20687=	20692=
U	0F18	24373	24376	24393	24398	20701=	20706=	20711=	20716=
U	0F20	24503	24508	24541	24544	24546	24562	20901=	20906=
U	0F28	24571	24575	24579	24623	24626	24642	20915=	20919=
U	0F30	24645	24661	24664	24720	20942=	24723	20946=	20951=
U	0F38				20957=				20964=
U	0F40				20968=				20976=
U	0F48					21000=		21004=	21009=
U	0F50					21014=			21021=
U	0F58					21036=			21043=
U	0F60						21055=		21059=
U	0F68						21062=		21067=
U	0F70							21081=	21086=
U	0F78				21092=				21097=
U	0F80	24766:	9738:	9743:		21133=		21137=	21141=
U	0F88						21263=		21266=
U	0F90					21346=	21350=	21353=	21357=
U	0F98							21463=	21467=
U	0FA0				23074=				23080=
U	0FA8				23224=				23231=
U	0FB0							23272=	23277=
U	0FB8						23297=		23301=
U	0FC0				23626=				23630=
U	0FC8					24087=			24091=
U	0FD0					24109=			24113=
U	0FD8				24476=				24480=
U	0FE0					24515=	24520=	24525=	
U	0FE8	24552=				24554=	24557=	24559=	
U	0FF0					24585=	24591=	24597=	

No errors detected
 End of microcode assembly
 717 pages of listing
 Used 755.10 seconds, 166 pages of core
 Symbol table: 50P
 Text strings: 18P
 Loc'n assignment: 37P
 Cross reference: 55P

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